

REMARKS

Claim 1 is being amended to include the recitation of “depositing an undoped transparent oxide semiconductor” within the body of the claim rather than in the preamble. This amendment introduces no new matter. This amendment is being made for clarity, and to more particularly point out and distinctly claim the process of the present invention. Specifically, the process of the present invention is limited to the deposition of transparent oxide semiconductors.

Claim 1 is also being amended to recite that the semiconductor comprises “at least one oxide selected from the group consisting of zinc oxide, indium oxide, tin oxide, and cadmium oxide”. This amendment is being made to clarify that combinations of the oxides can be present in the semiconductor. This amendment introduces no new matter, and is supported in the specification as filed, *inter alia*, on page 2, lines 4-7.

Claim 1 is also being amended to replace the shorthand designations of “TOS” and “TO-S” with “transparent oxide semiconductor” for consistency.

Claims 2-6 and 11 are being amended to replace “where” with “wherein”.

Claims 14-24 are being cancelled.

Rejections under 35 U.S.C. § 102 (b)

Claims 1, 2 and 7 were rejected under 35 U.S.C. § 102 (b) as being anticipated by Giancaterina et al. Giancaterina discloses the deposition of zinc oxide onto poly-ether-ether-ketone as a protectant against UV radiation. There is no disclosure in Giancaterina of any transparent oxide semiconductors in a field effect transistor, as recited in the present claims.

Claim 1 was rejected under 35 U.S.C. § 102 (e) as being anticipated by Konakhara et al. Konakhara discloses a method for growing an acicular oxide crystal on a substrate. Konakhara does not disclose or suggest zinc oxide as a semiconductor component in a field effect transistor.

The rejections of claims 14-22 and 24 under 35 U.S.C. § 102(b) as anticipated by Ohya et al. are moot, as these claims are being cancelled.

Rejections under 35 U.S.C. § 103

Claims 3-6, 12 and 13 were rejected under 35 U.S.C. § 103 (a) as being unpatentable over Giancaterina. This rejection is respectfully traversed. Applicant submits that Giancaterina neither discloses or suggests the deposition of transparent oxide semiconductors in a field effect transistor. The examiner states that one of ordinary skill in the art would have been led to the partial pressure of oxygen as

recited in claims 12 and 13. Applicant disagrees and respectfully submits that perhaps the Examiner is missing the point of Applicant's claims.

As disclosed on page 8, lines 13-24, of the present application, an effective partial pressure of oxygen is a range of oxygen partial pressure about the critical partial pressure such that the electrical resistivity is intermediate between a low, nearly-conductive value observed for very low oxygen partial pressures and a high, nearly-insulating value observed for high oxygen partial pressures. Applicants observed that the best performance (high channel current and high device on/off ratio) occurs when a transparent oxide semiconductor is made by vapor deposition in the preferable range of oxygen partial pressure, $0.1 P_c < pO_2 < 10 P_c$, and more preferably in the range, $0.5 P_c < pO_2 < 2 P_c$. Applicant submits that one would not have been led to use such a partial pressure of oxygen, or to be concerned about the partial pressure of oxygen, in view of Giancaterina and the prior art knowledge of PVD processes, because Giancaterina does not disclose any requirements for the performance of the oxide as a semiconductor, particularly used as a component in a field effect transistor. Applicants made the unexpected discovery that sputtering conditions favorable for achieving low metal oxide film stress were also favorable for high transconductance and high on/off current ratio in thin film transistor devices made at room temperature.

Claims 8-11 were rejected under 35 U.S.C. § 103 (a) as being unpatentable over Konakahara. This rejection is respectfully traversed. Applicant submits that although the CVD processes may have been well known at the time of Applicant's invention, the patentability of the claims of the present Application does not rely on the use of a particular deposition process, but rather on the total combination of steps as carried out in a field effect transistor. Applicant submits that Konakahara provides no teaching or suggestion of the process as claimed by Applicant.

CONCLUSION

Applicants submit that claims 1-13 are neither anticipated by nor rendered obvious by Giancaterina and/or Konakahara. Accordingly, allowance of the above-referenced application is respectfully requested.

Respectfully submitted,

/Gail D. Tanzer/

GAIL D TANZER
ATTORNEY FOR APPLICANTS
Registration No.: 40,979
Telephone: (302) 992-4947
Facsimile: (302) 992-5374

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